BTECH
(SEM III) THEORY EXAMINATION 2021-22
TECHNIQUES IN BIOTECHNOLOGY

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If you require any missing data, then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2x10 = 20**

Q No.	Questions	CO
(a)	Define 'bioink' with examples	5
(b)	What are the characteristics of an ideal biosensor?	5
(c)	What do you understand by sedimentation?	4
(d)	Define Microscopy? Explain its type using a Flow chart.	1
(e)	What is the difference between Bright and Dark field microscopy?	3
(f)	Why TEM is considered as the highest Resolution power microscope?	1
(g)	Write down the basic definition of Spectroscopy?	1
(h)	Define "resolution power" of a microscope and its relation with limit of resolution.	1
(i)	Explain Mobile and stationary phase with 2 examples.	5
(j)	What is the pH of these gels in SDS-PAGE i) stacking gel *ii) resolving gel* *iii) floating buffer*	1

SECTION B

2. Attempt any *three* of the following: **10x3 = 30**

Q No.	Questions	CO
(a)	Briefly discuss about the factors affecting the migration of substances gel electrophoresis.	4
(b)	What is the principle of centrifugation? Differentiate between preparative and analytical centrifugation.	2
(c)	Explain Transmission electron microscopy with a neat labeled diagram in detail.	1
(d)	Explain the electromagnetic waves (EM radiation & Spectrum) with its types.	3
(e)	What are Biosensors? Briefly discuss its working principle.	5

SECTION C

3. Attempt any *one* part of the following: **10x1 = 10**

Q No.	Questions	CO
(a)	Explain SDS PAGE and its application in detail.	2
(b)	Write a short note on: I. Positron Emission Tomography II. Agarose Electrophoresis	2

4. Attempt any *one* part of the following: **10x1 = 10**

Q No.	Questions	CO
(a)	Discuss the basic principle of NMR spectroscopy and its application in detail.	5
(b)	Explain the process of 3D-bioprinting of tissue and organs.	5

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Roll No: | | | | | | | | | | | | | |

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5. Attempt any *one* part of the following: **10x1 = 10**

Q No.	Questions	CO
(a)	Explain UV-VIS spectrophotometer with near labeled diagram in detail.	4
(b)	Explain the sedimentation tanks. Also discuss some factors that affect the sedimentation.	4

6. Attempt any *one* part of the following: **10x1 = 10**

Q No.	Questions	CO
(a)	Explain the process of Ion-Exchange chromatography.	3
(b)	Explain HPLC with neat labeled diagram and its applications	3

7. Attempt any *one* part of the following: **10x1 = 10**

Q No.	Questions	CO
(a)	Briefly discuss the principle and working of Flow Cytometry and explain its application.	2
(b)	Briefly explain the Gas chromatography along with its application and graph.	2